

The status of *Glyphocrangon rimapes* Bate, 1888 (Crustacea, Decapoda, Glyphocrangonidae)

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Introduction

In an excellent review of the genus *Glyphocrangon* in the Atlantic, Holthuis (1971) included *Glyphocrangon rimapes* Bate for the sake of completeness, although he had himself seen no specimens and, indeed, the species had not been recorded since Bate's (1888) original description based on material collected during the *Challenger* Expedition.

During an examination of decapods in the *Discovery* collections obtained in the north-eastern Atlantic in recent years, a number of specimens were identified with some difficulty as *rimapes* using Holthuis' key and prompted a re-examination of Bate's specimens since, as Holthuis pointed out, it was possible that these represented more than one species. In the event, the situation turned out to be rather more complicated than Holthuis imagined and, because of inadequacies in the original description, some minor changes are necessary to his key for the identification of the Atlantic species of the genus.

Bate (1888, pages 523–525) had before him four female specimens, one from Japan (stat. 237), two from near Juan Fernandez (stat. 300) and one from the South Atlantic near Tristan da Cunha (stat. 331). The illustration and the bulk of his description was based on the larger specimen from station 300, but Bate designated as the type the South Atlantic specimen. In Bate's list of material examined this latter specimen is described as an ovigerous female 87 mm in length,* and the specimen in the collection carrying the station 331 label agrees with this. Unfortunately, at the end of his description, and after dealing with the two specimens from station 300 near Juan Fernandez, Bate rather confuses the situation with the following statement.

In the middle of the South Atlantic, at Station 331, another specimen was trawled which was nearly 87 mm long, and has no teeth on the bosses of the coxal plates of the pleon. Another specimen about the same length was trawled at Station 237, in which teeth on the lateral bosses of the pleon are present. This animal is well developed, and is a female laden with about thirty large ova.

However, the specimen labelled as coming from station 237 is a good deal smaller than that labelled as from station 331 and is not bearing eggs. It is almost certain that Bate's statement quoted above is simply a mistake and that the South Atlantic specimen, and therefore the holotype of the species, is indeed the ovigerous female labelled as such in the collection. In the absence of any further documentary evidence in the British Museum (Natural History), either to substantiate or to counter this conclusion, I am assuming that it is correct.

In the section on the genus *Glyphocrangon*, Bate deals with seven species. He gives an extensive generic diagnosis and a very long description of *Glyphocrangon granulosis*, but the accounts of the other species are rather short. In the case of *G. rimapes* the description is basically a comparison with *G. granulosis* from which Bate distinguished it mainly on (1) having three pairs of teeth on the rostrum instead of two, (2) having a more prominent mid-dorsal crest running from the rostrum onto the carapace, (3) having rather longer spines on the pleural plates of the abdominal somites, (4) having teeth on the bosses on the lateral

*Bate's total lengths apparently exclude the rostrum.

surfaces of some of these plates, and (5) having bifid tips to the dactyls of the last pair of legs. By implication, Bate's description therefore indicates that in other major features *G. rimapes* resembles *G. granulosis*. This would include the presence of only two spines on the pleuron of the fifth abdominal somite, as is the case in most species of the genus. Unfortunately, the illustration in the *Challenger Report*, reproduced by Holthuis, appears to confirm this situation and Holthuis accordingly used this character very early in his key to separate off *Glyphocrangon sculpta* (Smith), the only Atlantic species which he thought possessed three pleural spines on this somite. In fact, the possession of three spines on the fifth somite is one of the most characteristic features of *G. rimapes*, although the third spine is admittedly missing from one side of the holotype. *G. rimapes* therefore keys out in Holthuis's key together with *G. sculpta* from which it can be distinguished on the rostral armature.

In view of these problems, and the fact that *G. rimapes* appears to be the only species reported from both the Atlantic and the Pacific, a redescription of the species in the light of the additional Atlantic material available, together with a re-assessment of the status of the Pacific specimens, seems warranted.

Glyphocrangon rimapes Bate, 1888

Glyphocrangon rimapes Bate, 1888, *Rep. Voy. Challenger*, Zool. **24**: 523, pl. 94, fig. 4—Holthuis, 1971, *Bull. mar. Sci.* **21**: 287, fig. 4. (Holthuis gives an extensive series of references, but none of them deal with new specimens or even with a re-examination of the original material.)

DESCRIPTION. *Holotype*: Oviparous female from *Challenger* Station 331 (March 9, 1876); 37°47'S: 30°20'W, 1715 fathoms (3138 m). C.L. (carapace length) 46·8 mm; T.L. (total length including the rostrum) c. 112 mm; P.O.C.L. (post-orbital carapace length) 27·4 mm (Figs 1A; 2A; 3A).

The carapace is glabrous. The rostrum extends just beyond the antennal peduncle and for about 1/4 of its length beyond the scaphocerite, this section being fairly strongly upturned. The dorsal surface of the rostrum is more or less flat distally, becoming slightly concave proximally; throughout its length it has a slight median ridge which breaks up into a series of seven or eight small spines behind the level of the eyes, increasing in size posteriorly and ending between the posterior lateral rostral spines. The dorso-lateral margins of the rostrum carry four spines on either side, a large one anterior to the eyes, two smaller ones close together immediately behind the eyes, and a very small spine immediately behind these. From this point the continuations of the rostral margins diverge strongly to end in a broad-based spine on either side at the anterior end of the anterior intermediate carina.

The antennal spine is directed strongly forwards and upwards, but only slightly outwards. The branchiostegal spine is directed strongly forwards, but is more or less horizontal so that it is parallel with the rostrum in lateral view. In dorsal view it is also more or less parallel with the antennal spine.

The anterior submedian carinae each carry about eight spiniform tubercles with scattered rather blunt tubercles between the two carinae medially. Laterally there are more blunt tubercles arranged in two rather indefinite and irregular rows, one close to the anterior submedian carinae, and one close to the anterior intermediate carinae. The latter are not well-defined, but consist of four spiniform tubercles and the strong anterior spine at the end of the continuations of the rostral margin.

The posterior submedian and intermediate carinae are not very clear, but are each marked by about four somewhat larger and more spiniform tubercles than those scattered between them.

The anterior antennal carina is not apparent; the region where it should run, between the anterior lateral carina and the lateral groove, simply carries a series of about 16 blunt tubercles. The posterior antennal carina, however, is a well-marked ridge running from the lateral groove to the postero-marginal groove and incorporating a series of tubercles which increase in size slightly posteriorly. Again there are scattered tubercles between the posterior

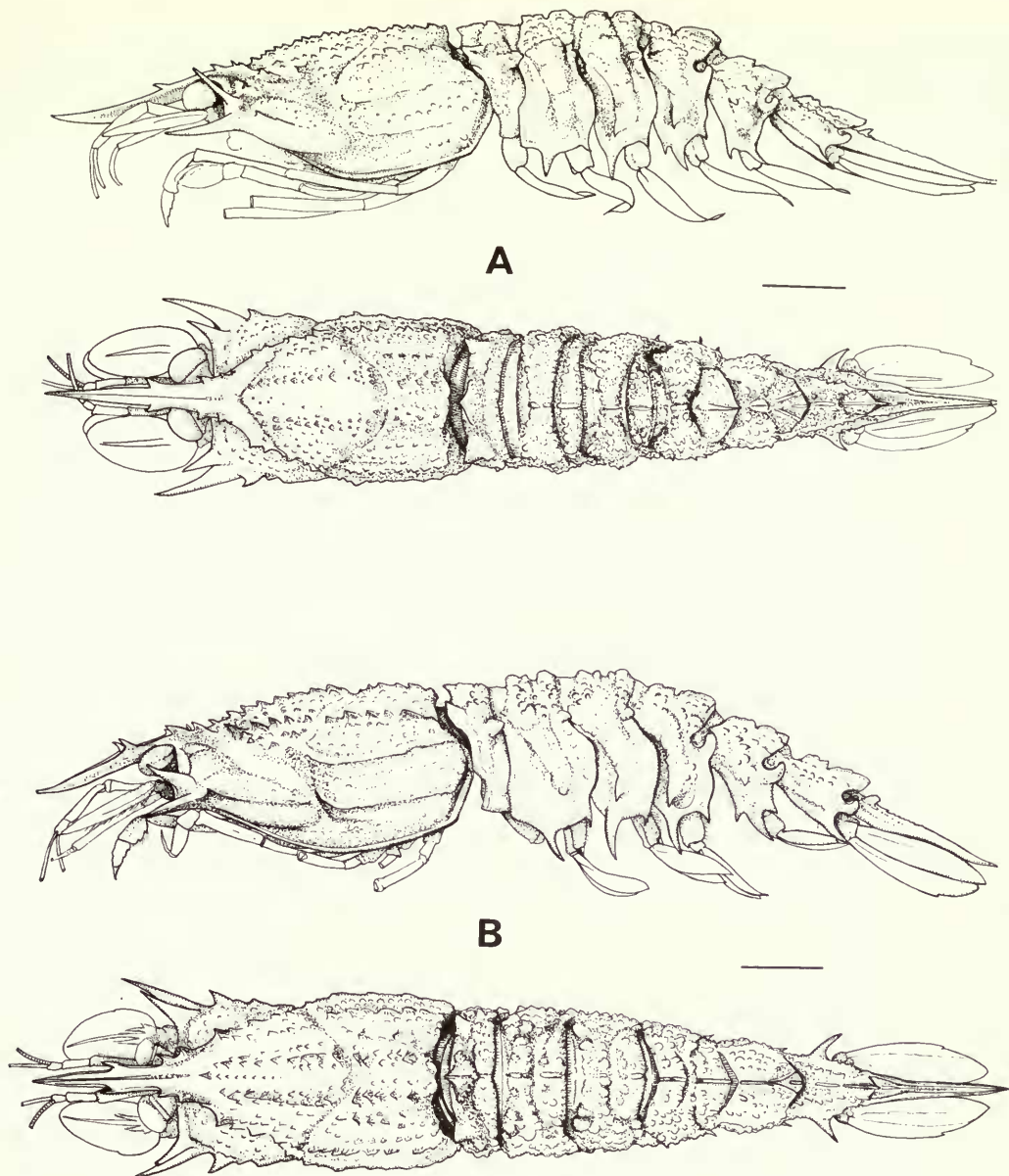


Fig. 1 *Glyphocrangon rimapes* Bate, 1888. A, holotype female from H.M.S. *Challenger* station 331. B, paratype female (C.L. 49.6 mm) from H.M.S. *Challenger* station 300. The bar scales represent 10.0 mm.

antennal carina and the posterior submedian carina, roughly arranged in three longitudinal rows.

The anterior lateral carina is quite well-marked and begins at a strong tooth at the base of the branchiostegal spine. Posteriorly the carina consists of a raised reticulated ridge of the integument running to the lateral groove. Beyond the groove the posterior lateral carina continues as a quite sharp, but not greatly raised ridge.

The anterior sub-lateral and sub-marginal carinae seem to be represented by two rather ill-defined reticulated areas of the integument, but separated by a very distinct groove

running from the end of the lateral groove towards the antero-lateral carapace margin. Unfortunately, the carapace is damaged on both sides in this region, (possibly by Bate in examining the branchiae which are rather disturbed), but the two carinae seem to be continued beyond the lateral groove as reticulated lines ending close to the postero-lateral carapace angle inside which there is a fairly strong tubercle.

The tubercles on the abdomen are generally rather blunt and crowded. The three large spines on the first somite are triangular and sharp and the mid-dorsal spine is followed by a small spine which is really the posterior section of the median carina. The median carina is interrupted in the middle on somites two and three, and rather more anteriorly on somites 4–6. On the fifth somite the sub-median carinae are well-marked, running from the end of the anterior median carina to the end of the somite. On the sixth somite the anterior component of the median carina is armed with two teeth and the posterior component ends in an acute point. The ventral margin of the pleuron of the second somite has a long spine medially, the postero-lateral angle carries a small spine, while the antero-lateral angle is more or less rectangular but unarmed. The boss in the centre of this pleuron carries a number of tubercles but these are not developed into spines. The pleuron of the third somite is armed with two teeth, the anterior being about three times as long as the posterior and more or less continuous with the anterior margin of the pleuron. The pleuron of the fourth somite is armed with three spines, the median the largest and the anterior the smallest. The bosses on the third and fourth somites are both armed with strong, downwardly directed conical spines. The pleuron of the fifth somite on the right hand side is armed with three spines, the median the longest and the posterior the smallest. This posterior spine is absent on the left hand side. The pleuron of the sixth somite ends in a strong backwardly directed spine which over-reaches the protopodite of the uropods.

The dorsal surface of the telson carries a large and a small conical spine anteriorly in the mid-line, and the sub-median carinae carry about 18 serrations which become smaller and more widely spaced posteriorly. The tip of the telson is broken, but it appears to over-reach slightly the blades of the uropods.

The antennal peduncle over-reaches the scaphocerite by the length of the distal segment. The outer margin of the scaphocerite carries no teeth.

The endopodite of the third maxilliped does not quite reach to the end of the scaphocerite.

The propodus of the first pereopod reaches about half-way along the first segment of the antennular peduncle.

The second pereopods are sub-equal, but the carpus of the left one consists of 17 segments and that of the right about 20.

The third pereopod over-reaches the scaphocerite by the length of the dactyl, which is about 1/3 the length of the propodus and is slender and styliform.

The fourth pereopod over-reaches the scaphocerite by the length of the dactyl, while the last pereopod reaches just to the end of the scaphocerite. The dactyls of both the fourth and fifth pereopods are somewhat flattened, widest in the middle, grooved on their outer surfaces and have bifid tips. Their bases are each surrounded by a fringe of hairs on the end of the propodus.

The ova, of which there are about 35, are approximately 3.0 mm in diameter.

THE REMAINING SYNTYPE MATERIAL. 1. Non-ovigerous female from *Challenger* station 300 (December 17, 1875), 33°42'S; 78°18'W, 1375 fathoms (2516 m), C.L. 49.6 mm, T.L. c. 123 mm; P.O.C.L. 31.4 mm (Figs 1B; 2B; 3B).

This is the largest of the two specimens from this station and is the one on which Bate's description and illustration was apparently based. It is very similar to the holotype, differing from it only in the following details.

The rostrum is rather shorter, not reaching quite to the end of antennal peduncle and only just over-reaching the scaphocerite. The dorsal surface of the rostrum is concave throughout its length and has a more prominent median ridge than in the holotype. The dorso-lateral rostral margins carry three pairs of spines which are rather more prominent than those in the

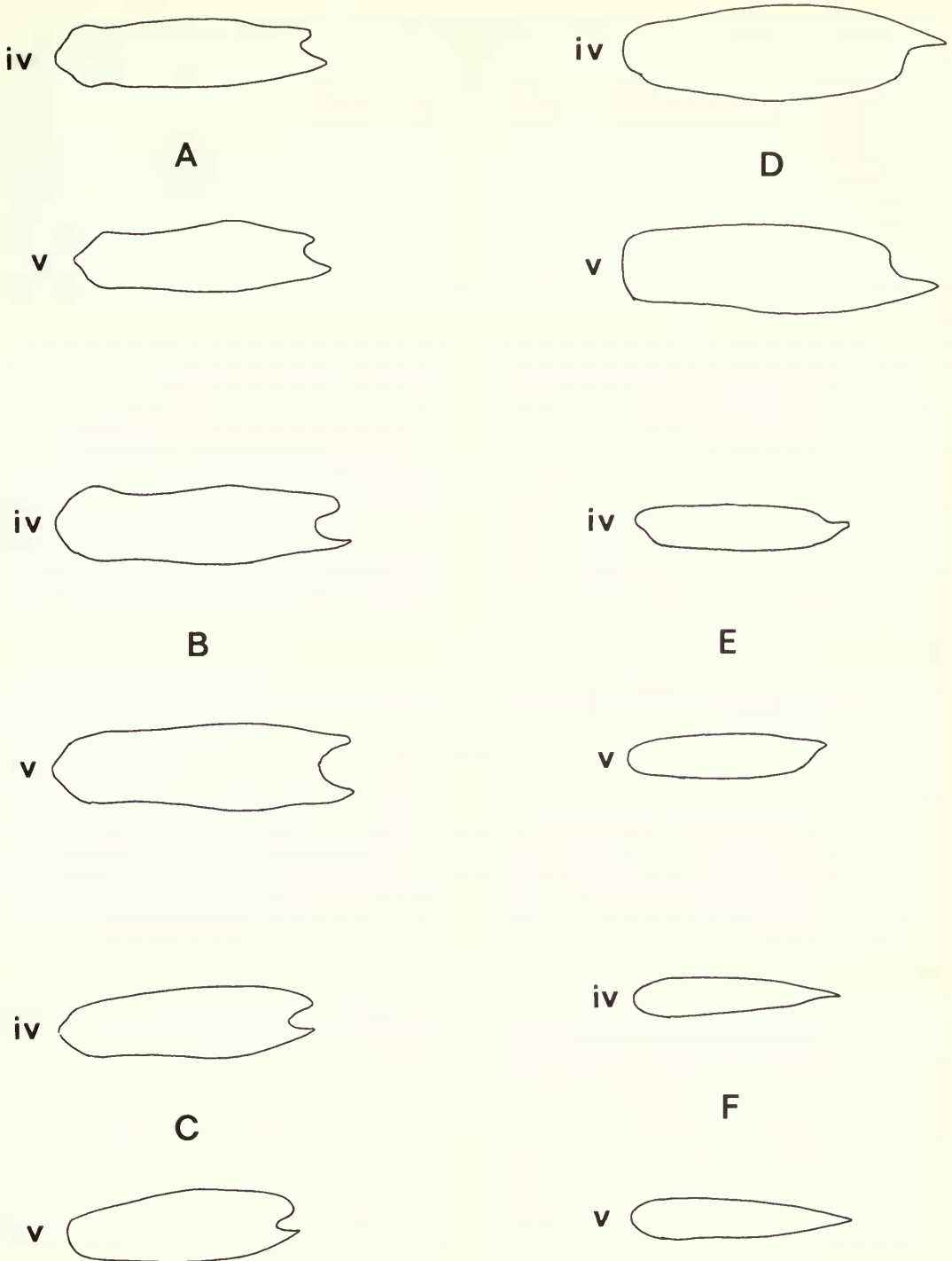


Fig. 2 *Glyphocrangon rimapes* Bate, 1888. Dactyls of the fourth (IV) and fifth (V) pereiopods. A, holotype female; B, paratype female (C.L. 49.6 mm) from H.M.S. *Challenger* station 300; C, ovigerous female (C.L. 44.8) from *Discovery* station 9640; D, paratype female (C.L. 33.2 mm) from H.M.S. *Challenger* station 300; E, male from *Discovery* station 9640; F, male from R.V. *Challenger* station 50604. Not all drawn to same scale.

holotype, but the small fourth pair are missing. The antennal spines are more obliquely directed than in the holotype so that in dorsal view they converge upon the branchiostegal spines rather than running parallel to them. The remainder of the carapace is very similar to that of the holotype except that the tubercles are generally a little more prominent, those at the end of the posterior median carinae overhang the posterior marginal groove as a bifid projection, and the anterior lateral carinae carry two fairly well-marked teeth on the right hand side and one tooth on the left, in addition to the strong anterior one.

On the abdominal somites the ventral spines on the pleural plates are generally rather longer than those of the holotype, but there are only two spines on the pleura of the fourth somite and three on both sides of somite five. The spines on the lateral bosses on somites three and four are better developed and more acute than in the holotype.

The scaphocerite has no properly developed outer tooth, but there is a slight protruberance on the outer margin.

The third maxilliped is slightly longer than in the holotype and reaches the end of the scaphocerite.

The carpus of the second pereiopod consists of only 18 segments on the right hand side and 15 on the left.

The third pereiopods are missing, but the dactyls of the fourth and fifth pereiopods are bifid, as in the holotype. However, in this specimen the dactyls each have a boss close to the articulation with the propodus which prevents the dactyl being flexed beyond about 90° with the propodus.

2. Non-ovigerous female from *Challenger* station 237 (June 17, 1874), 34°37'N; 140°32'E, 1875 fathoms (3431 m), C.L. 38·0 mm; T.L. c. 90·0 mm, but telson tip broken; P.O.C.L. 24·0 mm (Fig. 3D).

This specimen closely resembles the holotype, and particularly the large specimen from Juan Fernandez, different only in the following.

The lateral rostral margin carries three teeth on the left hand side and four on the right, the extra one being a small tooth between the posterior pair, not represented in either of the other two specimens. The anterior lateral carinae each have a prominent posterior tooth and, between this and the anterior tooth, a single very small tooth on the right hand side and two on the left.

The abdomen is very similar to that of the Juan Fernandez specimen except that the antero-ventral corners of the pleura of the first somite are produced forwards as short, blunt spines, the spines on the bosses of somites three and four are less acute, and the ventral teeth on the pleura are shorter and more like those of the holotype, while the pleuron on the left hand side of somite five carries three teeth.

The appendages are very similar to those of the holotype, the scaphocerite having almost no suggestion of a marginal spine, the carpus of the second pereiopod consisting of 21 segments on the right hand side and 18 on the left, and the bifid dactyls of pereiopods four and five lacking the basal bosses present on the Juan Fernandez specimen.

3. Non-ovigerous female from *Challenger* station 300 (see specimen 1, above), C.L. 33·2 mm; T.L. c. 77·2 mm; P.O.C.L. 18·0 mm (Figs 2D & 3C).

Apart from being considerably smaller, this specimen differs from the others of the type series in a number of features.

The rostrum is considerably longer, over-reaching the antennal peduncle by about one quarter of its own length and the stylocerite by about one third; it broadens significantly in its distal half and the dorsal surface has distinct corrugations. The dorso-lateral margins carry three pairs of spines, but the posterior pair are very small. The carinae and grooves of the carapace are much the same as in the other specimens, but the tubercles are generally much less well-defined and tooth-like. The anterior tooth on the anterior lateral carina is broad-based and not very acutely tipped, while the single tooth behind this is also very broad based and poorly defined.

The dorsal and lateral surfaces of the abdomen are also generally like the other type specimens, but, as on the carapace, the tubercles are less numerous and less tooth-like. The

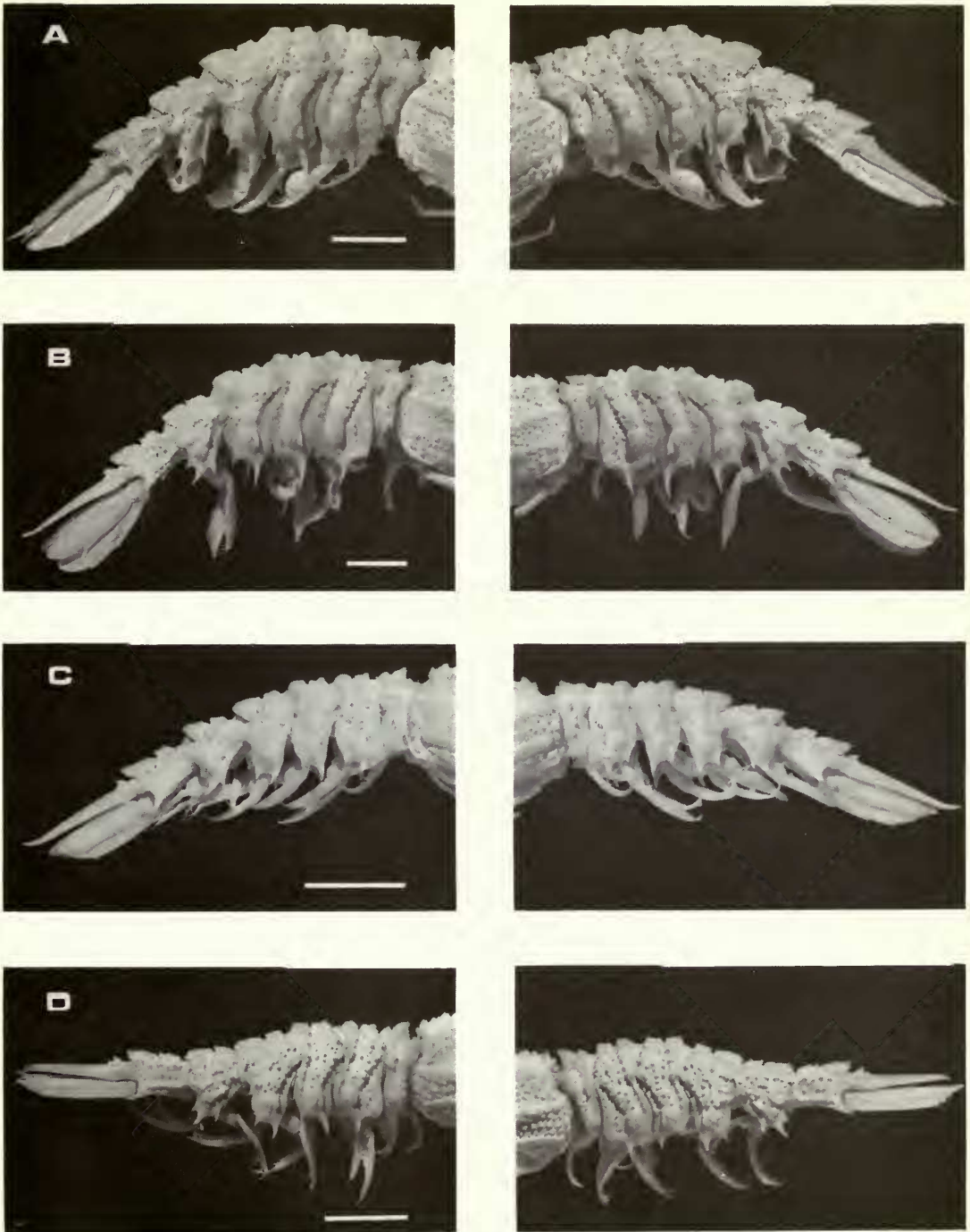


Fig. 3 *Glyphocrangon rimapes* Bate, 1888. Right hand side and left hand side views of the abdomens of the type series to show variations in the pleural spines. A, holotype; B, paratype (C.L. 49.6 mm), H.M.S. *Challenger* station 300; C, paratype (C.L. 33.2 mm), H.M.S. *Challenger* station 300; D, paratype, H.M.S. *Challenger* station 237. The bar scales represent 10.0 mm.

Table 1 Material of *Glyphocrangon rimapes* Bate examined

Station	Position	Depth (m)	Sex	C.L.(mm) (A)	P.O.C.L.(mm) (B)	T.L.(mm)	A/B	Remarks	B.M.(N.H.) reg. no.
HMS <i>Challenger</i> 331	37°47'0"S: 30°20'0"W	3138	♀	46·8	27·4	c 112·0	1·71	Holotype (ovig.)	88 : 33
HMS <i>Challenger</i> 300	33°42'0"S: 78°18'0"W	2516	♀	49·6	31·4	c 123·0	1·58	Paratype	88 : 33
HMS <i>Challenger</i> 237	34°37'0"N: 140°32'0"E	3431	♀	33·2	18·0	c 77·2	1·84	Paratype	88 : 33
RRS <i>Discovery</i> 9638	49°50'2"N: 14°7'3"W	4043-4104	♂	38·0	24·0	c 90·0	1·58	Paratype	88 : 33
RRS <i>Discovery</i> 9640	50°3'2"N: 13°50'6"W	3749-3757	♀	35·3	20·6	c 87·0	1·71		1980 : 188
			♀	44·8	26·7	c 109·2	1·68	ovig.	1980 : 189
			♀	37·3	21·3	?	1·75		1980 : 190
			♂	39·2	22·4	c 96·0	1·75		1980 : 191
RV <i>Challenger</i> 50512	50°13'6"N: 13°34'5"W	3022-3110	♀	41·4	24·8	c 100·7	1·66	ovig.	1980 : 192
			♀	45·4	25·5	c 104·5	1·80	ovig.	1980 : 193
RV <i>Challenger</i> 50604	50°6'1"N: 13°53'0"W	3490-3550	♂	22·3	11·7	c 51·5	1·90		1980 : 194

bosses on the pleura of somites three and four are quite pronounced but, as Bate pointed out, they are not armed with teeth. The pleura of somites 2–5 each carry only two ventro-lateral spines.

The outer margin of the scaphocerite has a small notch, as in the other Pacific specimens, but this seems to be more distally placed. Several of the more posterior appendages are damaged but the second pereopods have the carpus divided into about 20 segments on the right hand side and about 15 on the left. Finally, the dactyls of pereopods four and five are not bifid, but have a stepped outline and terminate in a single acute tip; they do not have a basal boss.

NEW MATERIAL. During a series of cruises undertaken since 1977 to investigate the benthic fauna of the Porcupine Sea-Bight to the south-west of Ireland, a further four female and three male specimens of *G. rimapes* have been collected at depths ranging from about 3000 m to a little over 4000 m (see Table 1).

The females all resemble the holotype but are even more similar to the large specimen from station 300 since, like it, they have only three pairs of spines of the rostral margin, the pleura of somite four carry only two spines, while there are consistently three spines on the pleura on each side of somite five. The only significant difference between these specimens and those of the type series is that the spines on the bosses of the pleura of somites three and four are rather less well-developed.

The two largest male specimens resemble the recently collected females very closely, although the pleural spines are rather shorter and there is a suggestion of a third spine on the fourth abdominal somite (see Fig. 4C). The main distinction from the females, however, is that while the dactyls of the fourth and fifth pereopods are more flattened than those of the styliform third pair, they end in a single point and at most have a step near the tip (see Fig. 2E). Thus, as in *Glyphocrangon sculpta* (see Holthuis, 1971; Barnard, 1950) it is only the females which have the characteristic bifid dactyls.

The smallest male (from station 50604) has a well-developed appendix masculina and non-bifid dactyls on the last two pereopods. However, it differs from the other males, and from most of the females, in having a relatively much longer rostrum which over-reaches the scaphocerite by almost half its own length, in having the posterior rostral spines very much smaller than the more anterior ones, and in having a quite prominent notch in the outer margin of the scaphocerite slightly anterior to its mid-point.

DISCUSSION. The suggestion by Holthuis (1971, p. 287) that Bate's specimens might include more than one species was presumably prompted by the wide separation of the localities from which they were obtained, together with the fact that no other species of the genus had been recorded from both the Atlantic and from the Indo-Pacific. From an examination of the type series alone, I would have had little hesitation in concluding that three of the four specimens, that is the holotype from the southern Atlantic, the specimen from off Japan and the larger of the two specimens from Juan Fernandez, belong to the same species despite the slight differences, particularly in the pleural armature, between them. The fourth specimen, that is the smaller female from Juan Fernandez, is rather different since, not only does it have a distinct pleural armature with only two spines on the fifth somite, but it lacks the bifid dactyls on the fourth and fifth pereopods, it has a very reduced posterior rostral spine, and a relatively longer rostrum. With the additional north-Atlantic material available, however, these variations seem to be acceptable. For although the pleura of the fourth and fifth abdominal somites usually have two and three teeth respectively, these are quite variable. Similarly, while the rostrum always apparently has at least three pairs of lateral spines, the posterior pair may be very small, particularly in juvenile specimens, while additional spines may be present. Finally, the rostrum becomes relatively shorter in older specimens, being almost twice the post-orbital carapace length in the smallest specimen available and less than two thirds as long in the largest.

The new material extends the known depth range of *G. rimapes* from 2500 m to 4100 m

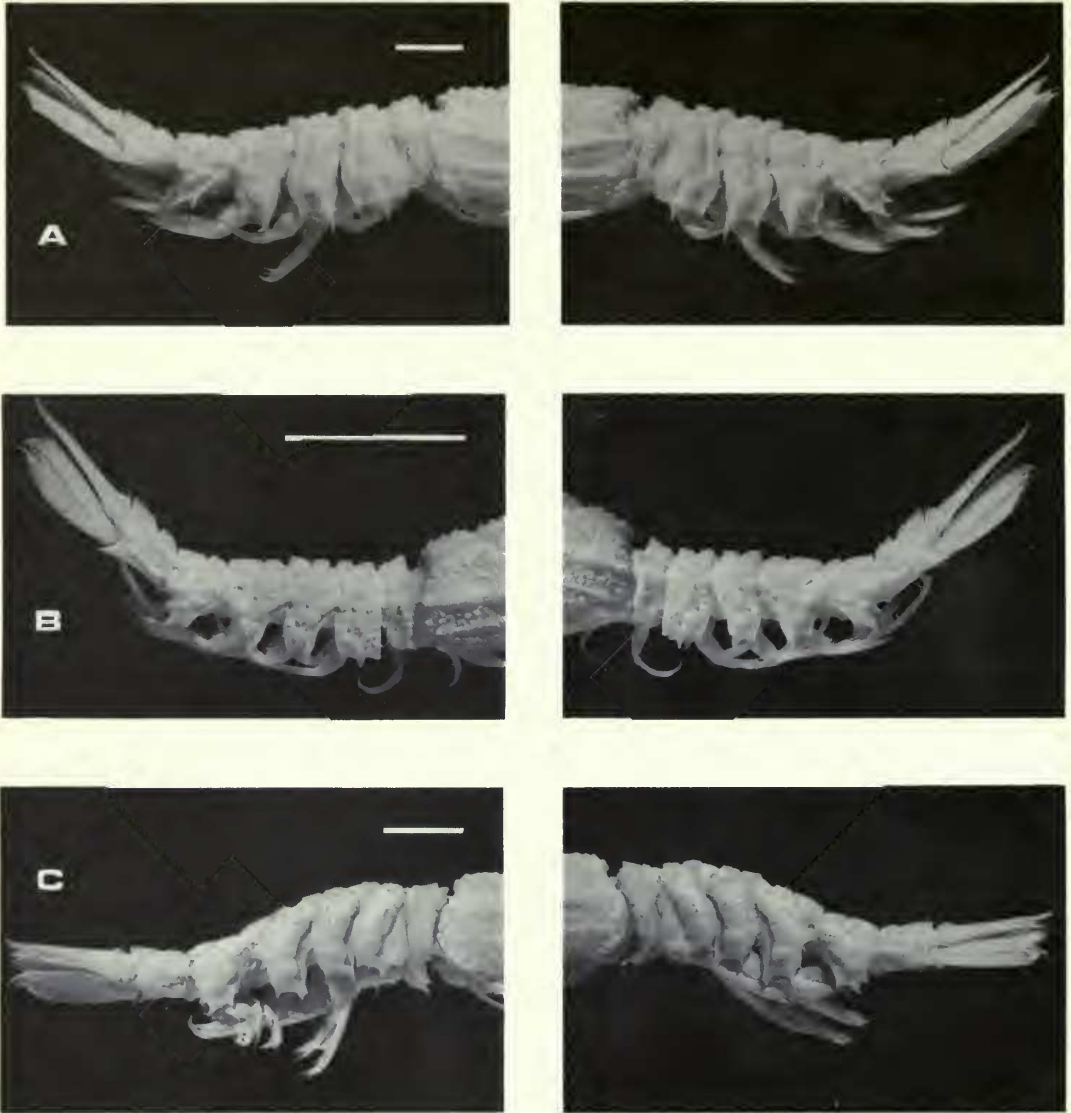


Fig. 4 *Glyphocrangon rimapes* Bate, 1888. Right hand side and left hand side views of the abdomens of three specimens from the Porcupine Sea-Bight. A, female (C.L. 44.8 mm), *Discovery* station 9640; B, male, R.V. *Challenger* station 50604; C, male, *Discovery* station 9640. The bar scales represent 10.0 mm.

and the horizontal distribution to include the northeastern Atlantic. In the Porcupine Sea-Bight region *rimapes* overlaps at the shallower end of its range with *G. sculpta* (Smith) and is replaced at depths a little over 4000 m by *G. atlantica* Chace.

In order that Holthuis's key should cope adequately with *rimapes*, his third couplet should be removed and *rimapes* should be distinguished from all other Atlantic species at the beginning of the key by the presence of at least three pairs of rostral spines in this species.

Acknowledgements

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